



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Examiner: Karl Tamai)
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Applicant: Stephen A. Debelius)
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Serial No.: 09/293,455)
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Filed: April 16, 1999)
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For: **ARMATURE SHAFT RETAINER**)

APPEAL BRIEF

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Dear Sir:

This is an appeal from the October 24, 2000, final rejection of Claims 14, 6-11, 13-18, 20 and 21 of the above-identified application. Claims 5, 12 and 19 are objected to by the Examiner. No claims have been cancelled. A copy of the Examiner's Final Office Action dated October 24, 2000 is attached as Appendix A.

Claims 1-4, 6-11, 13-18, 20 and 21 are rejected under 35 U.S.C. Section 103(a) as being unpatentable over Dafler in view of Wrobel. Claims 6, 13 and 20 are rejected under 35 U.S.C. Section 103(a) as being unpatentable over the above references further in view of Rosenthal, Jr. et al. Claims 5, 12 and 19 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. No claims have been cancelled. The claims on appeal are Claims 1-4, 6-11, 13-18, 20 and 21 and are reproduced in attached Appendix B. The references cited by the Examiner, specifically Dafler, Wrobel and Rosenthal, Jr. et al, are attached hereto in Appendix C.

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REAL PARTY IN INTEREST

Black & Decker Inc. is the real party in interest, being the assignee of the present application.

RELATED APPEALS AND INTERFERENCES

To the best of Applicant's knowledge, no other appeals or interferences are pending which will directly affect or be directly affected by or have a bearing on the Board's decision in the present pending appeal.

STATUS OF THE CLAIMS

Claims 1-4, 6-11, 13-18, 20 and 21 stand finally rejected. Claims 5, 12 and 19 are objected to as being dependent upon rejected base claims but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

STATUS OF AMENDMENTS

No amendments were made to the claims after the final rejection on October 24, 2000.

SUMMARY OF THE INVENTION

The invention relates to power tools (10) (Figure 1) which include a motor (14) surrounded by a housing (12). The motor (14) includes an armature shaft (42) which is retained at one end by a retainer (100) (Figures 2 and 3). The retainer (100) is press-fit

onto the shaft (42). The retainer (100) is positioned within an enlarged diameter portion (84) of a central bore (82) of a bearing (80). The bearing (80), in turn, is positioned within the bearing housing (70). The retainer (100) seats on the bearing shoulder (86) to register the bearing (80). Also, the retainer provides registration for the commutator (50) as well as the rotor (44).

A copy of the patent application is attached as Appendix D.

ISSUE

Appellant presents the following issues for review:

- 1) Whether or not Claims 1-4, 7-11, 14-18 and 21 are unpatentable under 35 U.S.C. Section 103(a) over Dafler in view of Wrobel.
- 2) Whether or not Claims 6, 13 and 20 are unpatentable under 35 U.S.C. Section 103(a) over Dafler in view of Wrobel further in view of Rosenthal, Jr. et al.

GROUPING OF THE CLAIMS

Claims 1-4, 6 and 7 stand or fall together. Claims 8-11, 13 and 14 stand or fall together. Claims 15-18, 20 and 21 stand or fall together.

ARGUMENT

Background of the Invention

The present invention relates to power tools and, more particularly, to motors utilized in the power tools.

In manufacturing electric motors, it is important to have proper alignment between the armature, which includes the rotor and commutator, with the brushes and the stator

assembly. Proper alignment prohibits axial movement or end play which may occur in the motor when the armature shaft is positioned within the motor. Excessive axial shifting is known to cause noise, vibration, and excessive wear during operation. Thus, it is desirable to limit axial movement of the armature shaft in the motor.

In the past, armature shafts have included grooves with slip rings, such as C-rings, as well as washers to maintain the axial integrity of the shaft. However, these types of connections have enabled more axial play than is desired in the shaft. Thus, it would be desirable to maintain the axial integrity of the armature shaft within the motor. Also, it is desirable to provide a registration point so that the commutator and rotor could be positioned along the shaft.

Thus, the present invention relates to motors for power tools which include a retainer on the shaft. The retainer fits within an enlarged bore of the bearing to provide registration of the bearing. Also, the retainer provides registration for the commutator as well as the rotor. The Dafler reference, in combination with Wrobel, fail to render the present invention obvious to those skilled in the art. Likewise, the combination of Dafler in view of Wrobel and further in view of Rosenthal, Jr. et al fail to render the present invention obvious to the skilled artisan.

It is respectfully submitted that the Examiner is misapplying the references and is utilizing hindsight to reconstruct Applicant's invention.

First, the Examiner starts with the Dafler reference. Dafler discloses a bearing support assembly for a motor. The bearing assembly utilizes a pair of spring retainers positioning the bearing on the shaft. A thrust collar abuts the end of the bearing to confine the bearing between the end of the rotor assembly and the inner side of the thrust

collar (see column 4, lines 13-52). The Examiner combines Dafler with Wrobel, alleging that the combination discloses Applicant's invention. Wrobel discloses a slide bearing unit for small size fans. In one embodiment, Wrobel illustrates a spring-loaded bearing which includes an enlarged bore in the bearing. A groove in the shaft, along with a slip ring, maintains the bearing on the shaft. While Wrobel discloses an enlarged bore portion, there is no motivation or suggestion that such a bore would be utilized on the bearing of Dafler as suggested by the Examiner.

With respect to Claims 6, 13 and 20, the Examiner combines the above two references further in view of Rosenthal, Jr. et al. Rosenthal, Jr. et al illustrates a fan mounting assembly and includes an auxiliary illustration of a washer between a commutator and a bearing.

As mentioned above, the present invention relates to an armature shaft in an electric motor in a power tool. The armature shaft is defined in Claim 1. The electric motor is defined in Claim 8. The power tool is defined in Claim 15. All of these are illustrated in Appendix B. The combination of references, specifically Dafler and Wrobel, fail to shed any light on the problem solved by Applicant's invention. Further, this combination with Rosenthal, Jr. et al fails to disclose or suggest Applicant's invention.

The court, in In re Fritch, 23 USPQ 2d 1780 (Fed. Cir. 1992), stated that:

"Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so. Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the

modification obvious unless the prior art suggested the desirability of the modification." at 1783 emphasis original.

Here, there is no suggestion or motivation of the desirability to combine the Dafler reference with the Wrobel reference. In fact, the ring of the Dafler reference has a diameter larger than the diameter of the bearing where the two abut. Thus, there is no motivation or suggestion to have an enlarged bore portion in the bearing of the Dafler reference. In order to have an enlarged bore portion, which the retainer could fit into in Dafler, the Dafler bearing would be reduced to half its size.

The Examiner is relying upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or template to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that:

"[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

In re Fritch, supra, 1784.

This is exactly what the Examiner has done in applying the Section 103 rejection. The Examiner has pieced together the references to allegedly render Applicant's invention obvious. It is clear that the Examiner cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. There is no motivation or suggestion in the Wrobel reference to combine it with Dafler. In fact, to modify Dafler as suggested by Wrobel would most likely render the bearing of Dafler inoperable.

With respect to the combination of Dafler, Wrobel and Rosenthal, Jr. et al, the Examiner again continues to pick and choose among isolated disclosures in the prior art

to deprecate the claimed invention. Here, the Examiner has picked the washer from the Rosenthal, Jr. et al reference and has totally disregarded the remaining disclosure of this reference. Clearly, this is not the intent of Section 103.

Claims 1-4, 6 and 7 stand or fall together. Claims 8-12 and 14 stand or fall together. Claims 15-18, 20 and 21 stand or fall together. Accordingly, Applicant believes the above grouping to be proper.

CONCLUSION

Applicant respectfully submits that the Examiner has not proved that his combination represents a prima facie case of obviousness as the references cited do not teach the elements of the claimed invention, much less suggest the combination of the references. In fact, the Dafler reference teaches a bearing which has a smaller diameter than the retaining ring at the abutment of the two. Thus, the Examiner's claimed combination would not render the invention obvious to those skilled in the art.

Applicant's invention provides the art with an improved armature in a motor in a power tool that is neither suggested or disclosed by the prior art. Accordingly, reversal of the final rejection of Claims 1-4, 6-11, 13-18, 20 and 21 and allowance of the claims is respectfully requested.

Respectfully submitted,

HARNESS, DICKEY & PIERCE, P.L.C.

Dated: April 20, 2001

BY:



W. R. Duke Taylor
Reg. No. 31306
Attorneys for Applicant

P.O. Box 828
Bloomfield Hills, MI 48303
(248) 641-1600

Attorney Docket No. 0275D-000247

CLAIMS ON APPEAL

1. An armature shaft comprising:
 - a shaft having two ends;
 - a commutator on said shaft;
 - at least one bearing on said shaft, said bearing adjacent one of said ends of said shaft, said bearing having a central bore sized to support said shaft during rotation, said central bore having an enlarged portion opening towards said one end of said shaft; and
 - a retainer on said shaft for retaining said bearing on said shaft, said retainer positioned within said enlarged bore portion of said bearing.
2. The armature shaft according to Claim 1, wherein a bearing housing surrounds said bearing, said housing adapted for fixing with a motor end plate.
3. The armature shaft according to Claim 2, wherein said bearing housing having a receiving bore for receiving said bearing, said receiving bore having a stepped configuration.
4. The armature shaft according to Claim 3, wherein said bearing has an outer surface with a step configuration for seating with said bearing housing.
6. The armature shaft according to Claim 1, wherein a washer separates said bearing from said commutator.

7. The armature shaft according to Claim 1, wherein said enlarged bore portion defines an abutting shoulder, said retainer abutting said shoulder.

8. An electric motor comprising:

- a stator assembly;
- an armature shaft rotatable within said stator assembly;
- a commutator rotatable with said armature and connected to said armature via a shaft;
- brushes associated with said commutator, said brushes held in an end plate;
- at least one bearing on said shaft, said bearing adjacent one of said ends of said shaft, said bearing having a central bore sized to support said shaft during rotation, said central bore having an enlarged portion opening toward said one end of said shaft; and
- a retainer on said shaft for retaining said bearing on said shaft, said retainer positioned within said enlarged bore portion of said bearing; and
- a bearing at the other end of said shaft.

9. The electric motor according to Claim 8, wherein a bearing housing surrounds said bearing, said housing fixed with said end plate.

10. The electric motor according to Claim 9, wherein said bearing housing having a receiving bore for receiving said bearing, said receiving bore having a stepped configuration.

11. The electric motor according to Claim 10, wherein said bearing has an outer surface with a step configuration for seating with said bearing housing.

13. The electric motor according to Claim 8, wherein a washer separates said bearing from said commutator.

14. The electric motor according to Claim 8, wherein said enlarged bore portion defines an abutting shoulder, said retainer abutting said shoulder.

15. A power tool comprising:

- a housing;
- a stator assembly;
- an armature rotatable within said stator assembly;
- a commutator rotatable with said armature and connected to said armature via a shaft;
- brushes associated with said commutator, said brushes held in an end plate;
- at least one bearing on said shaft, said bearing adjacent one of said ends of said shaft, said bearing having a central bore sized to support said shaft during rotation, said central bore having an enlarged portion opening toward said one end of said shaft;
- a retainer on said shaft for retaining said bearing on said shaft, said retainer positioned within said enlarged bore portion of said bearing;
- a bearing at the other end of said shaft;
- a power source electrically coupled with said motor;
- an activation member electrically coupled with said motor and said power source for energizing and de-energizing said motor; and
- an output coupled with said motor for driving a tool.

16. The power tool according to Claim 15, wherein a bearing housing surrounds said bearing, said housing fixed with said end plate.

17. The power tool according to Claim 16, wherein said bearing housing having a receiving bore for receiving said bearing, said receiving bore having a stepped configuration.

18. The power tool according to Claim 17, wherein said bearing has an outer surface with a step configuration for seating with said bearing housing.

20. The power tool according to Claim 15, wherein a washer separates said bearing from said commutator.

21. The power tool according to Claim 15, wherein said enlarged bore portion defines an abutting shoulder, said retainer abutting said shoulder.